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REPORT ON

BAXTER CREEK SURVEY

WITH PERTINENT

SANITARY SURVEY REPORTS

ON

VILLAGE OF MILLBROOK

TOWNSHIP OF CAVAN

TOWNSHIP SOUTH MONAGHAN

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PARLIAMENT BUILDINGS - TORONTO

REPORT ON

BAXTER CREEK SURVEY

with pertinent

Sanitary Survey Reports

on

VILLAGE OF MILLBROOK

TOWNSHIP OF CAVAN

TOWNSHIP OF SOUTH MONAGHAN

BY:

R.Barrens, C.S.I.(C.)
Engineer's Assistant.

Supervised by:

G.Kay, P.Eng.
District Engineer

Environment Ontario
Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
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A REPORT ON BAXTER CREEK SURVEY

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Map of Baxter Creek Watershed - 1959

Map of Village of Millbrook and Environs - 1959.

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MUNICIPALITY: Counties of Northumberland and Durham

Re: Baxter Creek Survey

Date of Inspection: March 16, April 6, July 27, December 15, 16,17, 1959.

Field Inspection by: R.Barrens

Report by: R.Barrens, C.S.I.(C.)

INTRODUCTION

This report deals with a survey which was conducted during 1959 to determine the sanitary chemical and bacteriological qualities of the water of Baxter Creek and its tributaries. Initial investigations and sampling were conducted on March 16th and April 6th, 1959, and were confined to sections of Baxter Creek in the vicinity of the Village of Millbrook. Further investigations and an overall sampling programme were carried out on July 27th, and during the period of December 15th to 17th, 1959.

This survey was concerned mainly with Baxter Creek and its tributaries, and included pertinent sanitary surveys of the Village of Millbrook, and portions of the Township of Cavan and the Township of South Monaghan which are drained either to this watercourse or to tributaries thereof.

Following the investigations on March 16th and April 6th, 1959, a report was prepared and distributed to the appropriate persons. This information has been

incorporated with the results of subsequent investigations conducted on July 27th and December 15th to 17th, 1959, in this report.

GENERAL

Investigations of this type are made by the Ontario Water Resources Commission in its programme to control pollution of all surface and ground waters. The procedure followed is to examine the waters and all sources of pollution, and to take the necessary steps where there is impairment of the quality of the water. In this way an effort is made to ensure that the water quality will be suitable for domestic, industrial and agricultural purposes, the support of fish and wildlife, for recreational purposes and all riparian requirements.

Discussions were held at the outset with officials of the various municipalities which were concerned in this survey. Enquiries were made to determine the amount of industrial activity in the area, and the disposal of storm water, process water, and sanitary wastes as they might affect the quality of the receiving waters.

Maps were obtained from various sources.

The co-operation which was received from the Northumberland-Durham Health Unit staff, municipal officials as listed below, and from other persons interviewed during the investigations is appreciated:

Mrs.G.Dawe, Millbrook, Village Clerk;

Mrs.Z.M.Bentley, Millbrook, Clerk of Twp. of Cavan;

Mr.J.E.Robinson, R.R.1, South Monaghan, Clerk of the Twp.of South Monaghan;

and the following members of the Northumberland-Durham Health Unit staff:

Dr.C.M.Horner, Medical Officer of Health and Director;

Mr.J.Finlayson, Chief Sanitary Inspector;

Mr.W.Ford, Sanitary Inspector.

Reports on the municipal sanitary surveys of the Village of Millbrook and portions of the Township of Cavan and the Township of South Monaghan which are pertinent to Baxter Creek, have been prepared and are appended to this report.

BAXTER CREEK WATERSHED

The greater portion of the Baxter Creek Watershed lies within the Village of Millbrook and the Township of Cavan, with lesser portions lying within the Townships of South Monaghan, Manvers, and Clarke. The total drainage area is composed of an estimated 23,028 acres, measuring approximately thirteen(13)miles in length. Its greatest width is approximately five(5)miles. The headwaters of Baxter Creek have their source in Concessions One(1) and Two(2), Township of Manvers. The stream flows in a north-easterly direction through the Village of Millbrook to its

mouth at the Otonabee River. Throughout its course the creek is joined by several small tributaries.

The Baxter Creek Watershed is predominantly a rural area. The Village of Millbrook straddles the watercourse, and is the only municipality lying wholly within this watershed.

WATER USES

There is little industrial or municipal use of the waters of Baxter Creek.

Industrial use of the waters of Baxter Creek is noted at Millbrook where a gristmill and a sawmill may employ waterpower.

Recreational use of the stream is of significance with respect to swimming areas, summer camps, and wildlife. Swimming areas are located on the creek within the Village of Millbrook and at Camp Rollin' Acres, a summer camp which is located approximately three(3)miles downstream from Millbrook.

With respect to wildlife, brown trout and speckled trout reportedly inhabit the waters of Baxter Creek, particularly in its upper reaches.

Municipal use of the stream is limited to its employment, within the Village of Millbrook, as a receiving water for municipal storm sewer discharges containing untreated or inadequately treated sanitary and industrial wastes,

and surface drainage. Millbrook straddles the creek but obtains its water supply from ground water sources. Baxter Creek would be the receiving water for the effluent from any future sewage works within the Village of Millbrook.

A tributary of Baxter Creek receives contaminated flows from the Ontario Reformatory within the Township of Cavan. A private sewage treatment plant to serve this institution had been under construction and has been completed subsequent to this survey. The treated sewage effluent will be discharged to the local tributary of Baxter Creek.

In the upper reaches of Baxter Creek, water is drawn from the stream for irrigation purposes in connection with tobacco farming.

HYDROLOGY

Precipitation records are available from the Climatology Section, Meteorological Division, Department of Transport. Measurements which are available from a number of stations in this vicinity indicate an annual average of approximately thirty(30) inches.

Stream flow data for Baxter Creek are not available since there are no gauging stations on this stream.

SAMPLING PROCEDURE

Sampling points are shown on the appended map of the Baxter Creek Watershed, as well as on the maps of the

respective municipalities. These locations were selected to provide essential information on the quality of the waters of the creek and its associated tributaries. "Grab" samples were collected: forty(40) ounce samples being used for sanitary chemical analysis, and six(6)ounce samples for bacteriological analysis. Tests were conducted at the Ontario Water Resources Commission laboratory, 46 Wellesley Street West, Toronto. The results of stream and outfall samples are shown in TablesI to III,inclusive.

The most common analyses of sanitary significance are: Biochemical Oxygen Demand, Suspended Solids, and the bacteriological determination expressed either as a Total Coliform(Indicated Number)or as a Membrane Filter Coliform Count.

Biochemical Oxygen Demand(B.O.D.)

The B.O.D.of sewage, polluted waters or industrial wastes is the oxygen required during stabilization(natural purification in a stream)of the decomposable organic matter or chemical material by aerobic biochemical action. Unless otherwise noted, a five-day B.O.D. determination with incubation at 20°C. is reported. A high B.O.D.is indicative of organic or chemical pollution. A desirable upper limit in natural water commonly is four(4)parts per million.

Suspended Solids

These results are reported in parts per million and indicate the measure of undissolved solids of organic or

inorganic nature. Where suspended solids values approached 20 parts per million or less, laboratory difficulties usually result in these values being determined as turbidity and are reported in silica units.

Total Coliform Count

This count is reported per 100 millilitres and indicates bacteriological contamination by human or animal excrement, or by some nonfaecal forms. A coliform count of less than 1,000 organisms, Indicated Number, is considered desirable in streams.

Membrane Filter Coliform Count

The membrane filter technique is employed to obtain a direct enumeration of coliform organisms and is reported per 100 millilitres. A membrane filter coliform count in excess of the desirable upper limit of 2,400 organisms is considered to render the waters undesirable for municipal water supplies and bathing purposes.

Additional specific tests are employed to determine the nature and significance of industrial waste discharges.

SAMPLING PROGRAMME

Samples were collected on March 16th and on April 6th, 1959, from municipal storm sewer outfalls to Baxter Creek within the Village of Millbrook, and from the watercourse itself in the vicinity of that municipality. Overall sampling programmes were carried out on July 27th, and during

the period of December 15th to 17th, 1959.

SAMPLING CONDITIONS

Due to spring freshet conditions on March 16th and April 6th, 1959, the volume of flow in Baxter Creek was above normal, and turbid conditions were visually evident. The volumes of storm sewer discharges had increased due to surface run-off.

Depleted stream flows existed on July 27th, 1959. Storm sewer discharges were minimal in volume.

When samples were collected during the period of December 15th to 17th, 1959, there was a moderate cover of snow in the Baxter Creek Watershed. Some surface run-off was occurring as a result of moderating weather conditions.

SAMPLE RESULTS

Table I shows the results of samples collected from Baxter Creek and its tributaries. In Table II are shown the results of samples collected from municipal storm sewer outfalls. Results of private and institutional outfall samples are shown in Table III.

The analyses of samples collected from Baxter Creek and its tributaries reveal some significant areas of pollution. Satisfactory sanitary conditions were found in the upper reaches of the creek. Immediately downstream from Millbrook the water quality was adversely affected by wastes discharged to the watercourse within, or in the vicinity of, the village. The stream gradually recovers in

the lower reaches near its mouth. Two(2) municipal storm sewers conduct untreated or inadequately treated sanitary and industrial wastes to the watercourses within the village. Untreated or inadequately treated sanitary wastes similarly are discharged from a private sewer to the stream. Inadequately treated sanitary wastes are discharged from the Ontario Reformatory within the Township of Cavan to the flats near a tributary of Baxter Creek. The laboratory results revealed a high five-day B.O.D. and bacteriological content in the storm water discharges from the Reformatory to another tributary of the creek. This latter discharge contained laundry wastes and discharges from the license plate plant, as well as storm water. The sewage treatment plant which recently had been constructed to serve the Reformatory had not been completed at the time of field investigations pertinent to this survey, but subsequently has been completed and now is in use.

MUNICIPALITIES

In preparing this report on the Baxter Creek Survey, pertinent sanitary surveys were made of the municipalities which are directly concerned. A municipal sanitary survey report on the Village of Millbrook was made, as well as municipal sanitary survey reports on the Townships of Cavan and South Monaghan pertinent to Baxter Creek.

The municipalities lying either partly or wholly within the Baxter Creek Watershed are as follows:

Durham County:
Village of Millbrook
Township of Cavan
Township of Clarke
Township of Manvers

Northumberland County:
Township of South Monaghan
Non-incorporated community:
Fraserville

The Village of Millbrook is the only municipality lying wholly within the watershed of Baxter Creek.

The estimated contributing areas and populations from these municipalities to the Baxter Creek Watershed are tabled below:

	Area(in acres)	Population
Village of Millbrook	330(entirely in watershed)	805
Township of Cavan	19,407	600
Township of Clarke	366	10
Township of Manvers	1,458	25
Township of S.Monaghan	1,797	250

Durham County:

The Village of Millbrook covers an area of 330 acres, and has an assessed population of 805 according to the 1959 Municipal Directory. The municipality lies wholly within the watershed of Baxter Creek.

The village receives its water supply from one(1) municipal well, at least nine(9)wells serving two or more

premises, and many private wells. Private septic tank systems are employed in the absence of municipal sewage works. Networks of municipal storm sewers terminate on the banks of Baxter Creek, and obviously conduct some contaminated wastes, as well as storm water to the creek.

This information is expanded in the appended Village of Millbrook Municipal Sanitary Survey Report.

The Township of Cavan covers an area of 62,180 acres with an assessed population of 2,024. The contributing figures from the Township of Cavan to the Baxter Creek Watershed are estimated to be 19,407 acres and 600 persons.

This information is expanded in the appended Township of Cavan Sanitary Survey Report pertinent to Baxter Creek.

The Township of Clarke covers an area of 69,467 acres with an assessed population of 3,766. The contributing figures from this municipality to the Baxter Creek Watershed are estimated to be 366 acres and 10 persons.

A municipal sanitary survey report on the Township of Clarke was prepared by this Commission early in 1958, and was pertinent to surveys on the Ganaraska River, Wilmot Creek and Graham Creek. A very limited portion of the Baxter Creek Watershed lies within this municipality.

The Township of Manvers covers an area of 68,716 acres with an assessed population of 1,956. The area contributing from this municipality to the Baxter Creek

Watershed is estimated to be 1,458 acres and containing a limited number of persons.

There were no sampling points employed on Baxter Creek within the Townships of Clarke and Manvers.

Northumberland County:

The Township of South Monaghan covers an area of 18,583 acres with an assessed population of 709. The contributing figures from this municipality to the Baxter Creek Watershed are estimated to be 797 acres and 350 persons.

No outfalls to Baxter Creek were located within this township. This information is expanded in the appended Township of South Monaghan Sanitary Survey Report pertinent to Baxter Creek.

SUMMARY

Satisfactory conditions were found in the upper reaches of Baxter Creek with respect to the bacteriological and sanitary chemical qualities of its waters. Significant sources of pollution existed in and near the Village of Millbrook, resulting in adverse effects on the water quality in the stream. In the lower reaches of the stream near its mouth, the bacteriological and sanitary chemical qualities of its waters appeared to recover from the effects of these discharges.

Two(2)municipal storm sewers and one(1)private sewer discharge untreated or inadequately treated sanitary wastes to the creek within the village. One of these municipal sewers

also conducts dairy wastes.

From the Ontario Reformatory, within the Township of Cavan, inadequately treated sanitary wastes were discharging to the flats near a tributary of Baxter Creek. Storm water, untreated laundry wastes, and flows from the license plate plant at this institution, were discharging to another tributary of the creek with adverse results to the water quality thereof. Subsequent to the most recent visit to the Reformatory by Commission staff, the new sewage treatment plant at this institution has become operative.

RECOMMENDATIONS

1. The Village of Millbrook should undertake a programme to deal effectively with municipal storm sewers discharging to Baxter Creek within the municipality. Untreated or inadequately treated sanitary and industrial wastes present in these discharges either should be excluded from the watercourse or adequately stabilized prior to their discharge thereto. The latter solution could be effected by the provision of municipal sewage treatment works.

2. Appropriate measures should be adopted to exclude untreated or inadequately treated sanitary wastes from the private sewer(#3PS) which has its outlet on the bank of the creek in Millbrook.

MUNICIPALITY: Village of Millbrook

Re: Sanitary Survey of Millbrook - pertinent to Baxter Creek

Date of Inspection: March 16, April 6, July 27, December 15, 16, 17, 1959.

Field Inspection By: R. Barrens.

Report By: R. Barrens, C.S.I. (C.)

INTRODUCTION

This report results from investigations of the sanitary conditions of Baxter Creek and is an appendix to the Baxter Creek Survey report. It contains information on sanitary conditions within the village which are pertinent to Baxter Creek.

Appended is a map of Millbrook and its environs, showing the Ontario Reformatory which is located immediately west of the village within the Township of Cavan. Sampling points in the area are shown thereon. The laboratory results of samples are appended in Tables I to III, inclusive.

MUNICIPAL SANITARY SURVEY

The Village of Millbrook covers an area of 330 acres with an approximate population of 805, according to the 1959 Municipal Directory. The municipality lies wholly within the Baxter Creek Watershed. The community receives its water supply from one (1) municipal well, at least

nine (9) wells each serving two or more premises, and many private wells. Private septic tank systems are employed in the absence of municipal sewage works. Networks of municipal storm sewers have their outlets on the banks of Baxter Creek.

The laboratory results reveal that the waters of Baxter Creek immediately downstream from Millbrook are adversely affected in quality by the contaminated discharges from two (2) municipal storm sewer outlets and at least one private sewer outlet within the village. Contaminated flows discharging to a tributary of Baxter Creek from the Ontario Reformatory within the Township of Cavan also contribute to the deterioration of the water quality in the creek.

WATER WORKS

Millbrook receives its water supply from one (1) municipal well, at least nine (9) wells serving two or more premises and many private wells. The Millbrook Public and High School, the Canadian Legion Hall, and Shadynook Dairy each are served by private wells. Artesian or flowing wells are found in Millbrook. The average depth of drilled wells within the municipality is reported to be sixty (60) to one hundred (100) feet, with some deeper wells being approximately one hundred and fifty (150) feet deep.

Water samples were collected on March 16th and 17th, 1959, from the municipal well and from other wells which

are employed as a source of water supply for more than one household. The locations of these drilled wells are shown on the appended map of the village. Complete chemical and bacteriological analyses were conducted at the laboratories of the Ontario Water Resources Commission, Toronto. The laboratory results revealed an absence of coliform organisms in all of these water supplies at the time of sampling. The iron content in some of these waters was revealed to be in excess of the desirable upper limit for domestic use of 0.3 parts per million.

The municipally owned well and pertinent distribution system are supervised by the Millbrook Public Utilities Commission.

SEWAGE DISPOSAL

Private septic tank systems are employed in the absence of sanitary sewers. Malfunctioning of these systems occurs occasionally due to the lack of space for adequate tile beds, and a high ground water table in some areas. Members of the Northumberland-Durham Health Unit staff have investigated the methods of waste disposal which are employed by premises in Millbrook. These investigations revealed that, in some instances, premises located on the north side of King street discharge sanitary wastes to the municipal storm sewer which extends along that side of King street and has its outfall to Baxter Creek.

Septic tank installations in Millbrook are supervised

by members of the local Health Unit staff.

The effluent from any future sewage works at Millbrook would be discharged to Baxter Creek or a tributary thereof.

PRIVATE OUTFALLS

Sampling point #3PS is located where a private sewer from the premises of Mr. Lavergne Fallis, King Street, has its outfall to Baxter Creek in Millbrook. This building reportedly contains five (5) apartments. The existence of a septic tank was not determined. Dye testing and sampling were employed to establish the source and quality of the flows from this property to the watercourse. The following laboratory results of samples collected of this discharge on December 16th, 1959, are reported:

5-Day B.O.D. p.p.m.	Solids (p.p.m.) Total	Susp.	Diss.	Membrane Filter Coliform Count per 100 ml.
28	366	42	324	690,000

The above results confirm the presence of untreated or inadequately treated sanitary wastes in this private outfall.

STORM SEWERS

Two (2) municipal storm sewers serve the village and discharge to Baxter Creek. The following municipal storm sewer outfalls were located and sampled during this survey:

Sampling point #1WS is located where a municipal storm sewer discharges to Baxter Creek near Bank Street. The

laboratory results of samples collected from this discharge are as follows:

Date of Sample 1959	5-Day B.O.D. p.p.m.	Solids p.p.m. Total	Susp.	Diss.	Membrane Filter Coliform Count per 100 ml.
March 16	12	516	98	418	greater than 150
April 6	9	472	42	430	20,000
July 27	23	414	44	370	650,000
Dec.15	7.6	474	22	450	106,000

The above results reveal an excessive bacteriological content in this storm sewer effluent. Industrial wastes reportedly are discharged from Shadynook Dairy to this storm sewer.

Sampling point #2WS is located where a municipal storm sewer terminates on the west bank of Baxter Creek at the north side of King Street. This sewer extends along the south side of King Street, then crosses to the north side of the street near the bridge. The laboratory results of samples collected from this discharge are reported as follows:

Date of Sample 1959	5-Day B.O.D. p.p.m.	Solids p.p.m. Total	Susp.	Diss.	Membrane Filter Coliform Count per 100 ml.
April 6	200	532	110	422	5,000
July 27	346	1170	200	970	7,000,000
Dec.15	32	980	62	918	830

The above results reveal the presence of untreated or inadequately treated sanitary wastes in the discharges from this storm sewer to the creek. The presence of faecal material was visually evident at the time of

sampling. The intermittence of flows even during dry weather conditions indicates the purposes for which this sewer is employed.

INDUSTRY

The following is a list of the principal industries in Millbrook:

Shadynook Dairy
Millbrook Creamery
Two (2) sawmills
One (1) gristmill

The activities at the creamery presently are limited to egg-grading and refrigerated locker services.

Shadynook Dairy discharges its industrial wastes to the municipal storm sewer which extends past the dairy premises to Baxter Creek. Sanitary wastes are discharged to a septic tank system.

REFUSE DISPOSAL SITE

The present community refuse disposal site is located near the bank of the creek at Anne Street within the village. A visual inspection of this site during the early part of this survey revealed that refuse material may reach the watercourse. It was recommended by this Commission that consideration should be given either to the revision of operational procedures at this refuse disposal site, or to the selection of a new site where refuse material would not gain access to a watercourse. The latter solution was recommended by the local Health Unit staff. A re-inspection of this refuse disposal

site on December 16th, 1959, revealed that refuse still is placed here.

RECREATIONAL SITES

The use of Baxter Creek for swimming purposes within the village is limited in extent.

STREAM CONDITIONS

The deterioration of the bacteriological quality of the waters in Baxter Creek in the vicinity of Millbrook may be observed by comparing the results of samples collected upstream and downstream from the community, as follows:

Location of Sample	Date of Sample	5-Day B.O.D. p.p.m.	Solids (p.p.m.) Total	Susp.	Diss.	Turbidity in Silica Units	Membrane Filter Coliform Count per 100 ml.
Baxter Cr. at Con.Rd. 3- upstream from Millbrook	Mar.16	2.7	188	8	180		Sample broken
	Apr. 6	2.2	220	10	210		0
	July 27	0.9	172	--	--	2	107
	Dec.15	1.8	236	--	--	2	30
Baxter Cr. at Bank St., Millbrook- downstream from the community.	Mar.16	4.6	230	10	220		89
	Apr. 6	4.2	226	8	218		750
	July 27	1.3	236	--	--	8	7,100
	Dec.15	1.3	252	--	--	5	6,000

The discharge of untreated or inadequately treated sanitary wastes to Baxter Creek or its tributaries within the Village of Millbrook is particularly significant with respect to the location of a swimming area on the creek downstream from this municipality.

SUMMARY

The laboratory results of samples collected from two

(2) municipal storm sewer outfalls to Baxter Creek within the Village of Millbrook reveal the presence of high five-day B.O.D. and bacteriological contents in these discharges, indicative of untreated or inadequately treated sanitary wastes. Industrial wastes are discharged from Shadynook Dairy to one of these municipal storm sewers.

Sample results and dye testing revealed that untreated or inadequately treated sanitary wastes are discharged to the waters of Baxter Creek from the premises of Mr. Lavergne Fallis in Millbrook.

Millbrook's community refuse disposal site is located near the bank of Baxter Creek at Anne Street. Refuse material from this site may gain access to the waters of the creek.

RECOMMENDATIONS

The Village of Millbrook should undertake a programme to deal effectively with municipal storm sewers discharging to Baxter Creek within the municipality. The untreated or inadequately treated sanitary and industrial wastes present in these discharges either should be excluded from the watercourse or adequately stabilized prior to their discharge thereto. The latter solution could be effected by the provision of municipal sewage treatment works.

Methods should be adopted to exclude from Baxter Creek the untreated or inadequately treated sanitary wastes which presently are discharged from the premises of Mr.

Lavergne Fallis, Millbrook, to the watercourse. A revision of the waste disposal facilities serving these premises must be satisfactory to the local Medical Officer of Health.

MUNICIPALITY: Township of Cavan

Re: Sanitary Survey of Township of Cavan pertinent to Baxter Creek

Date of Inspection: March 16, April 6, July 27, December 15,16, 1959.

Field Inspection by: R.Barrens

Report by: R.Barrens, C.S.I.(C.)

INTRODUCTION

This report results from investigations of the sanitary conditions of Baxter Creek and is an appendix to the Baxter Creek Survey Report. It contains information on sanitary conditions within the township which are pertinent to Baxter Creek.

Sampling points within the municipality are shown on the appended map of the Baxter Creek Watershed. The location of an outfall from the Ontario Reformatory to a tributary of Baxter Creek within the township is shown on the map of Millbrook and its environs. The laboratory results of samples collected within the township are included in Tables I and III.

The Township of Cavan has an approximate area of 62,180 acres with an assessed population of 2,024. The contributing figures from the Township of Cavan to the Baxter Creek Watershed are estimated to be 19,407 acres and 600 persons.

The watersheds of the following streams are located in

the Township of Cavan:

Part of Jackson Creek
Part of Cavanville Creek
Part of Baxter Creek
Part of Squirrel Creek

In summation, the bacteriological and sanitary chemical qualities of the waters in Baxter Creek within the Township of Cavan were generally satisfactory during this survey, with some exceptions. Immediately downstream from the concentrated section of Millbrook(at sample point #OB 18.7) the waters of the creek were adversely affected on July 27th and December 15th, 1959, as a result of discharges thereto within the village. At sample point #OB 16.5, which is located approximately two(2) miles downstream from Millbrook, an improvement was revealed in the bacteriological quality of the water. The Reformatory Branch of Baxter Creek was receiving contaminated discharges from the Ontario Reformatory.

Septic tank installations within the Township of Cavan are supervised by members of the sanitation staff of the Northumberland-Durham Health Unit.

Industrial activity within the township is very limited in extent.

RECREATIONAL AREAS

Camp Rollin' Acres is located in Concession Six(6), approximately three(3) miles downstream from Millbrook. Fifty(50) to sixty(60) children normally are in residence at this camp during the summer months. A permanent dam is employed here. The stop logs reportedly are removed

during the winter months.

INSTITUTIONS

Ontario Reformatory

The Ontario Reformatory is located immediately west of the Village of Millbrook. The compound and four(4) staff houses are situated on a 75 acre tract of land.

Approximately 180 inmates are in custody at this reform institution which has a maximum inmate capacity of 240 persons. A staff of approximately 114 persons is maintained.

Activities at this institution include the manufacturing of metal license plates, and the operation of a tailor shop and laundry.

Visits were made to the Reformatory on March 17th, July 27th and December 16th, 1959, to investigate the methods of sewage disposal which are employed here, and to review the progress of this institution in revising and improving these methods. An inspection of the water works at the Reformatory was made on March 17th, 1959.

Water Works

Two drilled wells, each being approximately 100 to 200 feet deep, are located near the south-eastern corner of the Reformatory grounds and are the main sources of water supply for the institution and the four(4)staff houses. A drilled well located at each of the five(5) towers provides an emergency source of water supply for guards on duty. No treatment is provided for the water supply.

Water samples were taken from the distribution system at the Reformatory on March 17th, 1959, for complete chemical and bacteriological analyses. The results of laboratory tests revealed an absence of coliform organisms in these samples. The hardness and iron contents were slightly in excess of desirable limits.

Disposal of Industrial Wastes

Liquid wastes from the laundry and the license plate shop are discharged through a storm sewer to the Reformatory Branch of Baxter Creek. Toxic chemical waste discharges from the license plate shop reportedly are collected and buried. The laboratory results of samples collected from the storm sewer discharge to the creek on December 16th, 1959, are as follows:

Sample Point No.	Lab. No.	5 Day B.O.D. p.p.m.	Solids(p.p.m.) Total	Susp.	Diss.	Chromium as Cr	Membrane Filter Coliform Count per 100 ml.
5PSI	R2480	16	136	36	100	0	50,000

Iron as Fe: 1.20

The high five-day B.O.D. and bacteriological content could be attributed to the discharges from the laundry.

The adverse effects of these discharges on the sanitary chemical and bacteriological qualities of the waters in the Reformatory Branch of the creek are evident in the following results of samples taken from this tributary at Tupper Street, Millbrook:

Sample Point No.	Date of Sample	5 Day B.O.D. p.p.m.	Solids(p.p.m.) Total	Susp.	Diss.	Turbidity Silica Units	Membrane Filter Coliform Count/100ml.
OBR18.9	March 16	3.8	280	12	268		44
	April 6	3.2	270	16	254		0
	July 27	4.4	278	--	--	9	20,000
	Dec.16	1.0	242	--	--	10	3,000

April 6-pH at lab.- 6.9; Chromium as Cr- 0
Dec.16- Chromium as Cr - 0

Disposal of Sanitary Wastes

Until recently, two(2) separate septic tank systems have received the kitchen wastes and sanitary sewage from the Reformatory. At the times of these inspections during 1959, sewage was erupting from the northern tile bed and flowing down a gulley to the flats near a tributary of Baxter Creek. It was observed on December 16th, 1959, that both systems were in a state of malfunction. The following laboratory results reveal the unsatisfactory quality of these sewage flows on December 16th, 1959, where they discharged to the flats near the creek:

Sample Point No.	Lab. No.	5 Day B.O.D. p.p.m.	Solids(p.p.m.) Total	Susp.	Diss.	Membrane Filter Coliform Count per 100 ml.
4 PS	R2479	100	2622	2070	522	960,000

A sewage treatment plant to serve the Reformatory has been constructed and reportedly has become operative subsequent to this survey. A Yeomans Spiragester, which is a combination Spiraflo clarifier and sludge digester is employed. Following secondary treatment by the activated sludge process, the effluent is chlorinated and then discharged in a northerly direction through the private

storm sewer outlet to the creek. All contaminated flows from this institution reportedly are discharged to the sewage treatment plant now. An emergency bypass arrangement at the sewage treatment plant would permit sewage flows to discharge through the storm sewer outlet to the local tributary of Baxter Creek. This watercourse, which has been designated for the purposes of this report as the Reformatory Branch, flows eastward along the northern outskirts of Millbrook to its confluence with the main creek approximately one(1) mile east of the Reformatory.

SUMMARY

The sanitary chemical and bacteriological qualities of the waters of Baxter Creek within the Township of Cavan were revealed by sample results to be generally satisfactory at the time of this survey, with some exceptions. Immediately downstream from Millbrook the water quality was adversely affected by discharges to the watercourse within the village. The Reformatory Branch of the creek was receiving contaminated flows from the Ontario Reformatory within the township, and was revealed to be adversely affected by these discharges.

A summer camp for children is located on the banks of the creek approximately three(3)miles downstream from Millbrook. The use of the creek for recreational purposes at this location is a significant reason for ensuring the exclusion of all untreated wastes from the watercourse upstream from this summer camp.

The construction of a sewage treatment plant to serve the reform institution has been completed recently. This plant has been placed in operation subsequent to the inspections related to this survey. All contaminated flows from the reform institution reportedly are discharged to the sewage treatment plant now.

RECOMMENDATIONS

Future supervision of the waste disposal facilities at the Ontario Reformatory should be maintained to ensure that only adequately treated wastes, as well as uncontaminated flows, are permitted to discharge from this institution to local watercourses.

MUNICIPALITY: Township of South Monaghan

Re: Sanitary Survey of Township of South Monaghan- pertinent to Baxter Creek

Date of Inspection: March 16, April 6, July 27, December 15,17, 1959

Field Inspection by: R.Barrens

Report by: R.Barrens, C.S.I.(C.)

INTRODUCTION

This report contains information on sanitary conditions within the Township of South Monaghan which are pertinent to Baxter Creek.

The two(2) sampling points on Baxter Creek which are pertinent to this township are shown on the appended map of the Baxter Creek Watershed. The laboratory results of samples collected are shown in Table I.

The Township of South Monaghan covers an area of 18,853 acres with an assessed population of 709. The contributing figures from this township to the Baxter Creek Watershed are estimated to be 797 acres and 350 persons.

The watersheds of the following streams are located in the Township of South Monaghan:

Part of Baxter Creek
Part of Squirrel Creek

The portion of this township lying within the watershed of Baxter Creek is predominantly rural. The

marshy borders of the creek near its mouth at the Otonabee River have not been conducive to residential development.

Although located within the watershed of Baxter Creek, the community of Fraserville is not drained directly thereto. The only community located in the Baxter Creek Watershed within the Township of South Monaghan, Fraserville is situated in a low-lying area and has experienced associated local drainage problems. The possible construction of a drainage ditch to serve Fraserville reportedly would conduct these flows to the Otonabee River rather than to Baxter Creek. Approximately 60 per cent of the premises in this community of 200 to 300 persons are served by private septic tank systems, the remainder employing privies.

Septic tank installations within the township are supervised by members of the Northumberland-Durham Health Unit staff.

RECREATIONAL AREAS

Within this township, Baxter Creek rarely is employed for recreational purposes. Local residents reportedly favour the use of the Otonabee River or Rice Lake in preference to Baxter Creek.

The sanitary chemical and bacteriological qualities of the waters of Baxter Creek within this township were revealed by sample results to be satisfactory during this survey. No sources of pollution were found within this

municipality which would affect Baxter Creek.

SUMMARY

Satisfactory conditions, with respect to sanitary chemical and bacteriological qualities, were revealed in the waters of Baxter Creek within the Township of South Monaghan during this survey. No sources of pollution were found.

Watercourse: Baxter Creek
Date Sampled: See below

Sampled by:R.Barrens

All analyses reportedin p.p.m.unless otherwise indicated

Sample Date	Sample Point No.	Lab. No.	5 Day B.O.D.	Solids Total	Solids Susp.	Solids Diss.	Turbidity Silica Units	Bacteriological Lab. No.	Bacteriological M.F.Coliform Count per 100 ml.
July 27	OB 12.4	R929	1.7	228	--	--	3	R1143	400
Dec.15		R2466	1.6	2284	--	--	7	R3000	1,070
July 27	OB14.2	R930	1.5	274	--	--	3	R1144	400
Dec.15		R2467	2.1	298	--	--	6	R3001	1,140
July 27	OB15.6	R931	4.2	206	--	--	15	R1145	190
Dec.15		R2468	1.8	272	--	--	5	R3002	1,210

Table I

OB12.4 R929 - Mouth of Baxter Creek at Otonabee River
R2466

OB14.2 R930 - Baxter Creek at Hwy. #28
R2467

OB15.6 R931 - Baxter Creek at Con. Rd. 5, Twp. of Cavan
R2468

Watercourse: Baxter Creek
Date Sampled: See below

Sampled by: R.Barrens

All analyses reported in p.p.m.unless otherwise indicated.

Sample Date	Sample Point No.	Lab. No.	5 Day B.O.D.	Solids Total	Solids Susp.	Solids Diss.	Turbidity Silica Units	Bacteriological Lab. No.	Bacteriological M.F.Coliform Count per 100 ml.
July 27	OBS 16.5	R932	1.0	254	10	244	7	R1146	1,400
Dec.15		R2469	1.8	286	--	--	5	R3003	60
July 27	OB 16.5	R933	1.6	216	16	200	13	R1147	3,000
		R2470	1.8	258	--	--	10	R3004	1,280
Mar.16	OB 18.7	R26	4.6	230	10	220		350	29
Apr.6		R30	4.2	226	8	218		R20	750
July 27		R934	1.3	236	--	--	8	R1148	7,100
Dec.15		R2471	1.3	252	--	--	5	R3005	6,000

OBS 16.5 R932-R2469 South Branch at sideroad above junction

OB 16.5 R933-R2470 Baxter Creek at sideroad above junction

OB 18.7 R26, R30, R934, R2471 - Baxter Creek at Bank St., Millbrook

Watercourse: Baxter Creek
Date Sampled: See below

Sampled by: R.Barrens

All analyses reported in p.p.m.unless otherwise indicated

Sample Date	Sample Point No.	Lab. No.	5 Day B.O.D.	Solids Total	Solids Susp.	Solids Diss.	pH at lab.	iron as Fe	Turbidity Silica Units	Chromium as Cr	Bacteriological Lab. No.	Bacteriological M.F.Coliform Count per 100ml
Mar.16	OBR 18.9	R29	3.8	280	12	268					345	44
Apr.6		R33	3.2	270	16	254	6.9			0	R23	0
July 27		R937	4.4	278	--	--			9		R1151	20,000
Dec.16		R2477	1.0	242			0		10	0	R3011	3,000
Dec.16	OBM 19.2	R2500	2.8	370	46	324					R3016	2,600
Mar.16	OB 20.3	R28	2.7	188	8	180				Sample broken in transit		
Apr.6		R32	2.2	220	10	210					--	0
July 27		R938	0.9	172	--	--			2		R1152	107
Dec.15		R2474	1.8	236	--	--			2		R3008	30

Table I con't

OBR 18.9 R29
R33 - Reformatory Branch of Baxter Creek at Tupper St., Millbrook
R937
R2477

OBM 19.2 R2500 - Mouth of tributary to Baxter Creek- at Mill St., Millbrook

OB 20.3 R28
R32 - Baxter Creek at Conc.Rd.3, Twp.of Cavan
R938
R2474

Watercourse: Baxter Creek
Date Sampled: See below

Sampled by:R.Barrens

All analyses reported in p.p.m.unless otherwise indicated

Sample Date	Sample Point No.	Lab. No.	5 Day B.O.D.	Solids Total	Solids Susp.	Solids Diss.	Turbidity Silica Units	Bacteriological Lab.No.	Bacteriological M.F.Coliform Count per 100 ml.
July 27	OBNW 20.8	R939	0.7	208	--	--	2	R1153	110
Dec.16		R2475	1.7	238	--	--	3	R3009	80
July 27	OB 20.8	R940	0.7	184	--	--	2	R1154	113
Dec.16		R2476	1.1	226	--	--	3	R3010	30

OBNW 20.8 R939 - North-western tributary at Conc.Rd.3, Twp.of Cavan
R2475

OB 20.8 R940 - Baxter Creek at sideroad above junction with north-western tributary
R2476

Table I con't

Municipality: Village of Millbrook
Source: Municipal Storm Sewer Outfalls to Baxter Creek
Date Sampled: See below.

By: R. Barrens

All analyses reported in p.p.m. unless otherwise indicated.

Sample Point No.	Date of Sample	5-Day B.O.D.	Solids Total	Susp.	Diss.	Lab No.	Turbidity in Silica Units	Lab No.	Membrane Filter Coliform Count/100 ml.
1WS	Mar. 16	12	516	98	418	R27		351	greater than 150
	Apr. 6	9	472	42	430	R31		R21	20,000
	July 27	23	414	44	370	R935	38	R1149	650,000
	Dec. 15	7.6	472	22	450	R2472		R3006	106,000
2WS	Mar. 16	No flow due to ice conditions							
	Apr. 6	200	532	110	422	R34		R24	5,000
	July 27	346	1170	200	970	R936		R1150	7,000,000
	Dec. 15	32	980	62	918	R2473		R3007	830

1WS R27, R31, R935, R2472 - Municipal storm sewer to Baxter Creek near Bank St., Millbrook

2WS R34, R936, R2473 - Municipal storm sewer to west bank of Baxter Creek- north side of King St., Millbrook

Table II

Municipality: Village of Millbrook - Twp. of Cavan
Source: Private outfalls to Baxter Creek
Date Sampled: December 16, 1959.

By: R. Barrens

All analyses reported in p.p.m. unless otherwise indicated.

Sample point No.	Lab No.	5-Day B.O.D.	Solids Total	Solids Susp.	Solids Diss.	Chromium as Cr	Iron as Fe	Lab No.	Membrane Filter Coliform Count/100 ml.
3 PS	R2481	28	366	42	324			R3015	690,000
4 PS	R2479	100	2622	2070	522			R3013	960,000
5 PSI	R2480	16	136	36	100	0.0	1.20	R3014	50,000

Table III

- 38 -

3 PS R2481 Outfall to Baxter Creek from premises of Mr. Lavergne Fallis, Millbrook

4 PS R2479 Partially treated sanitary wastes erupting from tile beds at Ontario Reformatory and discharging to watershed of Baxter Creek within the Village of Millbrook.

5 PSI R2480 Storm water, laundry wastes, and flows from license plate plant at Ontario Reformatory - discharging to "Reformatory Branch" of Baxter Creek within Twp. of Cavan.

BAXTER CREEK SURVEY

Maps

Baxter Creek Watershed- 1959

Village of Millbrook

and Environs- Sanitary Survey 1959

Ontario Water Resources Comm.
DIVISION OF SANITARY ENGINEERING.
Report on Baxter Creek
Survey.....

MOE/BAX/REP/ASCV

DATE	ISSUED TO

MOE/BAX/REP/ASCV
Ontario Water Resources Co
Report on Baxter
Creek survey with ascv
c.1 a aa

Environment Ontario
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Bibliothèque législative
Toronto, Ontario
LABORATORY & RESEARCH LIBRARY
LIBRARY OF THE ENVIRONMENT
Canada

78°30'
78°25'
78°20'
PETERBOROUGH CO.
N. MONAGHAN TWP.
FRASERVILLE
OTONABEE RIVER
DURHAM COUNTY
CAVAN TWP.
N
08 12 4
08 14 2
08 15 6
28
S. MONAGHAN TWP.
DAM
C N R
CR
08S 16 5
NORTHUMBERLAND COUNTY
ABANDONED
OR 19 7
08 16 5
44°10'
OBR 18 9
BAXTER
OBM 19 2
Reformatory Branch
DAM
MILLBROOK
OBNW 20 8
CAVAN TWP.
OR 20 3
DURHAM COUNTY
08 20 6
MANVERS TWP.
DAM
ONT GOVERNMENT FOREST RESERVE
HOPE TWP.
44°05'
CLARKE TWP.
LEGEND:
08 20 8 STREAM SAMPLING POINT SHOWING STREAM AND MILEAGE
ONTARIO WATER RESOURCES COMMISSION
BAXTER CREEK WATERSHED
1959
SCALE = 1:50000
OWRC TORONTO JUNE 1959 J H

ONTARIO REFORMATORY

NEW SEWAGE TREATMENT PLANT

EXISTING TILE BED

STORM SEWER & FUTURE S.T.P. OUTFALL

EXISTING TILE BED

(Not to scale)

REFORMATORY BRANCH

REFORMATORY WELL

TWP OF CAVAN

VILLAGE OF MILLBROOK

SITE PROPOSED FOR NEW HIGH SCHOOL

N

CREEK

BAXTER

FOOTBRIDGE

LANE

ANN ST

ANGLICAN CHURCH

CENTRE ST

UNITED CHURCH

PRESBYTERIAN CHURCH

DAIRY

KING ST

QUEEN ST

BREWING

CHARLES ST

MARSHALL ST

DEVELL

MILL ST

EXTENSION

PRINCESS ST

ANNE

MAIN ST

CAVEN ST

DUFFERIN ST

SCHOOL GROUND

VICTORIA ST

DUKE

BROCK

PLAY GROUND

AGRICULTURE PARK

DUMP

VILLAGE OF MILLBROOK
TOWNSHIP OF CAVAN

LOT 10

LOT 11

LOT 12

LOT 13

LEGEND

- A / PS1 — OUTLET SAMPLES SHOWING SEQUENCE NUMBER & TYPE
- TYPE OF OUTLET:
  - W — WATER (STORM SEWER)
  - S — UNTREATED OR PARTIALLY TREATED SEWAGE
  - P — PRIVATE
  - I — INDUSTRIAL WASTE
- SS187 — STREAM SAMPLING POINT
- MUNICIPAL BOUNDARY
- WELL

ONTARIO WATER RESOURCES COMMISSION

THE VILLAGE OF

MILLBROOK

AND

ENVIRONS

SANITARY SURVEY - 1959

SCALE 1" = 4 CHS APPROX

TORONTO 1960 S.H.